

MISCELLANEOUS NOTES ON AUSTRALIAN DIPTERA. II.

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(Five Text-figures.)

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Subfamily EMPIDINÆ.

The described Empidinae in Australia fall into two main biological units, the *Empis* and the *Hilara-Hilarempis* complexes. To these must be added the genus *Apalocnemis*, making a third unit that has the general features of the second complex, but without the water-breeding habits. Originally described from South America, this genus was later recorded by Collin from New Zealand, and now it has been found in Australia. The following key will enable it to be recognized:

1. With metapleural hairs or bristles. With a long outstanding bristle on the costa near the base *Empis*
Without metapleural hairs or bristles. Without a long outstanding bristle on costa 2
2. Proboscis of male directed forwards and much shorter than that on the female which is directed downwards. Bush-frequenting *Apalocnemis*
Proboscis in both sexes directed downwards and usually equal in length. Water frequenting and breeding *Hilara-Hilarempis* complex

This key contains characters additional to those in my earlier one (*Aust. Zool.*, vi, 1930, 241) which was based on that of Collin. The presence of a long outstanding bristle on the costa might apply to the *Empis*-complex throughout the World—apparently its importance has been overlooked, although it has often been shown in drawings.

APALOCNEMIS SANGUINEUS, n. sp. Text-fig. 5.

A black species with a grey pulverulent covering, except the abdomen, which is bright blood-red with a silvery pulverulent covering. The proboscis on the male is rather short and projects forwards, that of the female is as long as the depth of the head and projects downwards.

♂. The frons of the male is somewhat narrower than that of the female, and uniformly diverges towards the antennae, being at the ocellar tubercle about as wide as the anterior ocellus, and at the antennae as wide as the ocellar tubercle. At the base of the antennae there is a V-shaped indentation of the eye-margin, after which the eye-margin proceeds parallel down each side of the face. At one-third above the antennae, the frons has a small median depression and bordering the eyes is a row of very small and obscure bristly hairs. The face is bare and somewhat undulating, being prominent at one-third its length, and again more strongly so at the oral margin. The basal segment of the antennae is twice as long as the very short second segment, the third very long, being

more than four times as long as the two basal ones united, and beyond this is a very small fourth cylindrical segment that terminates in a depression containing a minute spine. The length of the fourth segment is about half the width of the third. The black proboscis is little longer than the length of the face, and the palpi are about as long as the oral opening, yellowish, cylindrical, but broadening at the apex into a rounded knob. The bristles of the palpi are rather long and strong, and those behind the head, below the weak postocular bristles, though irregularly placed, definitely form two further postocular rows.

On the thorax, three black stripes contain about two rows each of short bristly hairs, whilst the grey stripes between them are mainly bare. There is a strong bristle each side of the pronotum, a pair above each wing-insertion, one on each postocular callus, and three marginal pairs on the scutellum, and a weaker pair outside these; elsewhere the bristles are small and weak, increasing in length towards the scutellum, and at least a pair of intraalar bristles may be picked out. The pleura is bare.

The abdomen is entirely blood-red, but may fade somewhat, and it has very few hairs, except laterally on the two basal segments. From there onwards the abdomen has a silvery pulverulent overlay that depends upon the incidence of light to obscure the ground-colour. The black hypopygium is turned to lie with its apex pointing upwards and is rather long.

The legs are black, thickly covered with rather uniform short bristly pubescence and without bristles. The anterior metatarsus is swollen, as long as, but twice as thick as, the intermediate metatarsus.

The venation is normal, with the incomplete costal vein and the fourth radial vein rather straight. At the base, the wings are strongly suffused with black-brown; this colour fades out well before the apical margin.

♀. Very similar to the male but the frons is more parallel-sided, the upper part near the anterior ocellus being almost as wide as the ocellar tubercle, and at this area the bristles tend to form rows. There are four pairs of strong marginal scutellar bristles and the anterior metatarsus is not swollen.

Hab.—Queensland: Brisbane, 11 ♂, 8 ♀ taken in tea-tree country at Sunnybank and Broadwater, September, 1927 to 1933; it is not uncommon, but very few are seen in any season.

A closely allied species is represented by one male from Ringwood, Victoria, November, 1931, in the collection of Mr. F. E. Wilson. This specimen has the antennae longer and the wings suffused intensely over a larger area.

Genus EMPIS.

Only two species have been described from the mainland and four from Tasmania, but the genus is abundantly represented in collections. Two of the species described below are the only ones known from Sydney, and they are not related to the described Tasmanian species, all of which I have examined.

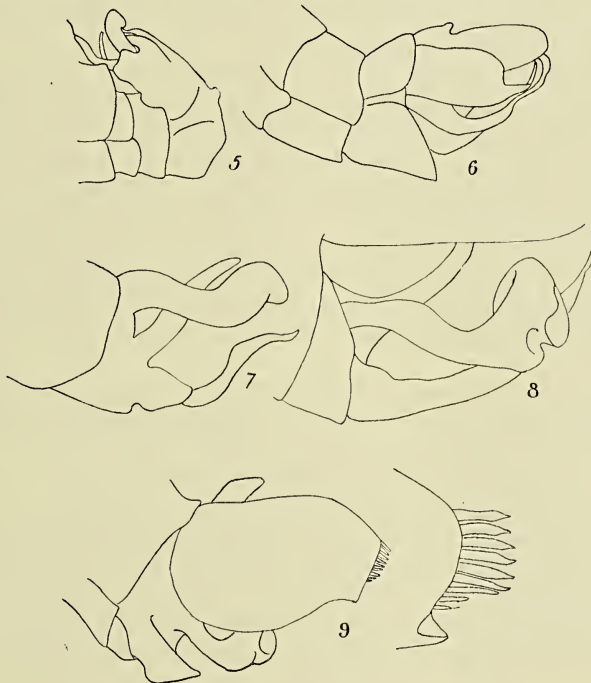
EMPIS XANTHOPYGA Schiner. Text-fig. 6.

Schiner, *Reise Novara Dipt.*, 1868, 204 (male only).

A black-brown species looking very much like *E. tenuirostris* Thomson, the female of which Schiner had confused with it, many characters being common to both. It may be distinguished from *E. tenuirostris* by the male having the first two segments of the hind tibiae swollen and by the hypopygium, whilst the female has some soft hairs on the face, a character missing in Thomson's species.

On the male there are two strong ocellar bristles and two rows of postorbital bristles, a pair on the pronotum and a pair on the prosternum; also 6 dorso-centrals, 2 or 3 humeral, 2 posthumeral, 5 notopleural, 1 presutural, 2 intraalar, 1 postalar and 2 marginal scutellar, each side of the median line; also a row of two or three long and a row of three weak metapleurals, five pairs of sub-marginals on the first abdominal segment and four on the others, and two pairs on the last four sternites; these are all more or less in conformity with those of *E. tenuirostris*. On the anterior femora, one row of bristles each on the anterior dorsal and ventral surfaces; similar rows on the intermediate femora, but a second ventral row is present; and on the posterior femora an anterior and ventral row and two subapical posterior bristles. The three pairs of tibiae have consecutively 2, 3 and 4 rows, whilst the posterior tarsi have the two basal segments swollen, with a few bristles and abundant long hairs.

The hypopygium is of the shape illustrated in Text-figure 6, and it has not been analysed for the purpose of determining the constituent parts, nevertheless it is of a shape not met with on any other of the species before me.



Text-fig. 5.—*Apalocnemis sanguineus*, n. sp.; lateral view of hypopygium.

Text-fig. 6.—*Empis xanthopyga* Schiner; lateral view of hypopygium.

Text-fig. 7.—*Empis tenuirostris* Thomson; lower portion of hypopygium showing clasper and spine.

Text-fig. 8.—*Empis alata*, n. sp.; lower portion of hypopygium showing clasper and spine.

Text-fig. 9.—*Empis waterhousei*, n. sp.; lateral view of hypopygium, and an enlarged view of the apical spines that occur at the apex of the upper forceps on all species in the *tenuirostris*-group.

In colour this is a black species with a pulverulent greyish overlay and a thin obscure abdominal margin, the venter, the legs and the hypopygium fulvous. The median marks of the thorax form three black stripes similar to those of *E. tenuirostris*, but closer together, and all reach the pronotum and, outside these, a brown presutural and a postsutural spot may occur. The wings are yellowish with fulvous veins.

The female is similar but the posterior tarsi are normal and there are short soft white hairs on the face.

Hab.—New South Wales: Sydney, 2 ♂, 2 ♀, August, 1932, in the vicinity of French's Forest. It is evidently a winter and early spring species, and has been overlooked by me when previously collecting owing to its early occurrence.

As the female described by Schiner under the name *xanthopyga* is *E. tenuirostris*, the females described here are marked as allotype and paratype. Schiner's male specimen is regarded as being the holotype.

EMPIS TENUIROSTRIS GROUP.

This group is to be recognized by the upper forceps of the hypopygium terminating in a row of broad, flattened bristles, six being well formed, and others somewhat reduced in size and shape.

The four species described here have in common a few bristly hairs on the frons, hardly or not perceptible on the male, a pair of large bristles on the ocellar tubercle, two widely separated postocular rows, a pair of bristles on the pronotum, two to four on the prosternum; also 5 to 9 dorsocentrals, 2 or 3 humerals, 2 or 3 posthumerals, 5 notopleurals, 1 presutural, 1 or 2 intraalars, 1 postalar, and 2 marginal scutellar on each side of the median line; together with four metapleural bristles in a row and sometimes another weak row. Occasionally one or two pairs of presutural acrostichal bristles are to be detected, but on one species there are five pairs, all small. Also a strong pair of cruciate presutural acrostichal bristles occur on one specimen, but this is probably incidental.

The abdomen has five pairs of submarginal bristles on all tergites, but one species has this number increased on the two basal segments. Also the sternites have a well formed median pair of bristles and a pair of outer weaker bristles may also occur. Dorsally some discal bristles are to be seen.

The coxae usually have a row of bristles, or the traces of a row. The rows on the femora are variable, being, at the maximum, one anterior, one dorsal, one posterior and two ventral. The tibiae and tarsi have up to four rows each. The wings are slightly tinged yellowish and the veins fulvous.

The variations that seem to mark specific limits are recorded below under the descriptions; the most consistent and easy to observe are used in the key.

Key to the males of the E. tenuirostris group.

1. With a conspicuous row of anterior acrostichal bristles. Anterior tibiae and tarsi unusually hairy, the hairs being about as long as the bristles, much longer than on the other legs *tibialis*, n. sp.
Without acrostichal bristles, or at most with one or two occasional pairs. Hairs of tibiae and tarsi uniformly short on all legs 2
2. Ten pairs of dorsocentral bristles *waterhousei*, n. sp.
Only five or six pairs of dorsocentral bristles 3
3. Abdomen fulvous or mainly so *alata*, n. sp.
Abdomen fuscous or mainly so *tenuirostris* Thomson

EMPIS TENUIROSTRIS Thomson. Text-fig. 7.

Syn.—*Empis xanthopyga* Schiner, females only.

The bristles of the thorax include two pairs on the prosternum, and only one row of metapleural. On the dorsum are 5 dorsocentrals, 2 humeral, 2 post-humeral, 1 presutural, 2 intraalar each side of the median line. On the legs, those on the intermediate coxae are missing; on the anterior femora, anteriorly there are two intermediate bristles and one subapical only. On the intermediate femora, anteriorly there is a row of bristles, but posteriorly only a subapical bristle. On the posterior femora the dorsal row is missing. In other respects the bristles on the legs are normal.

The hypopygium has a rather sinuous ventral spine and the width of the claspers rather uniform throughout, otherwise it conforms to that of *E. waterhousei*.

In colour the male has the head black, only part of the proboscis and the palpi being fulvous, and it is mainly covered with a pulverulent grey. A similar grey covers the black thorax but leaves three central stripes, the outer of which may be very broad, and in addition, there may be an elongate black presutural spot placed more laterally. The three central stripes reach about two-thirds the length of the thorax and only the central one approaches the head. There is also a tinge of yellow on the grey colour and this extends on to the scutellum. A similar pulverulent grey on the abdomen, extending from the base to half the second segment and on all incisions, leaves the abdomen black elsewhere and rather shining dorsally; this grey may extend over the venter which otherwise varies from black to fulvous; the hypopygium is also fulvous, tinged fuscous in part. The legs are fulvous and the hind femora are but slightly longer than the intermediate ones.

The female is similar, but the basal segments of the antennae are usually fulvous, which colour may also be more extensive on the abdomen.

Hab.—New South Wales: Sydney, 1 ♂, August, 1932, and Blackheath, 11 ♂, 15 ♀, November, 1919.

As Thomson described this species from the female only, the above males are labelled allotype and paratypes.

EMPIS ALATA, n. sp. Text-fig. 8.

The thorax contains three prosternal bristles and an extra row of weak metapleurals, also 6 dorsocentral and 3 posthumeral; in other ways the bristles conform to the normal, except that the male has a pair of presutural acrostichal that are cruciate and perhaps not consistent. On the anterior femora, one anterior row of bristles, and one posterior row; on intermediate femora, one each anterior and posterior and two ventral rows; on posterior femora, one each anterior, posterior and ventral. The tibiae have three rows on the anterior and four on the others.

The hypopygium is very like the others, but the claspers are provided with a strongly turned flange at apex and near this is a deep incision that is very marked and readily perceived from any angle. Also the spine is straight and long.

In colour the whole insect is fulvous, except the third segment of the antennae, the eyes, the bristles and certain dorsal marks of the thorax, all these being black, and the apices of the tarsi are fuscous. The thoracic markings are identical with those of *E. tenuirostris*, and there is a silvery-white sheen over

the abdomen and slightly on the legs, and the incidence of light might cause it to hide the ground colour.

The female is similar, but fuscous areas occur behind the eyes, on the scutellum and adjacent to it; on the abdomen a large dark spot occurs on each side of the second to fifth segments.

Hab.—New South Wales: Blackheath, 1 ♂, 1 ♀, November, 1919.

EMPIS WATERHOUSEI, n. sp. Text-fig. 9.

The bristles of the thorax are three prosternal, and an extra row of weak metapleural bristles. Those dorsally vary from the normal by having 10 dorso-centrals, 3 posthumeral, 2 or 3 small extra pronotal, and up to 4 postsutural bristles. There are nine or more pairs of submarginal bristles on the first abdominal segment and six or seven pairs on the second. The anterior femora have one row each anteriorly, posteriorly and ventrally, and the posterior tibiae have three rows; elsewhere the bristles are normal.

The hypopygium is normal, but the claspers are rather like those of *E. alata*, and they can be easily distinguished by the entire absence of the deep indentation, or at most a very slight one may occur in the same region. There is no sign of a ventral spine, but this may possibly have broken away, leaving no trace.

The head and thorax are black, mainly covered with a pulverulent brown, but grey on pleura, sides of dorsum and scutellum. The black dorsal stripes correspond to those of preceding species. The abdomen is rich fulvous, slightly shining and covered with a slight pulverulent grey, more intensely so at the base and ventrally. The legs are fulvous, with the femora slightly fuscous above.

The female is similar but the stripes of the thorax are rather obscure and have a deeper pair of very thin short stripes superimposed on the faint but unusually broad central stripe. The fuscous of the femora is confined to the anterior pair.

Hab.—New South Wales: Mt. Kosciusko, 1 ♂, 3 ♀, December, 1921. Collected by Dr. G. A. Waterhouse, after whom the species is named.

EMPIS TIBIALIS, n. sp.

The bristles of the thorax include four prosternals and two strong metapleurals and a row of weak ones. There are 5 presutural acrostichals, 7 or 8 dorsocentrals, 3 posthumeral each side of the median line. The anterior femora have a row of mainly weak bristles on anterior, dorsal and posterior sides, but there are outstanding bristles that occur in conformity with those on *E. tenuirostris*. The intermediate femora have one row each anteriorly and ventrally, and one subapical posterior bristle. The posterior femora have one row each on the anterior, dorsal and posterior sides. The anterior tibiae have three rows of bristles and, like the tarsi, are very hairy, the hairs being as long as the bristles. The intermediate and posterior tibiae have four rows of bristles, other characters being normal. The anterior metatarsus is slightly swollen.

The hypopygium has the forceps much as in other species but relatively smaller, and the claspers are rather simple, slender, with a simple broadened rounded apex. The ventral spine is represented by a pair of very bristle-like long filaments in no way comparable with that of other species.

The insect is almost entirely black with a pulverulent grey that gives place to brown on the dorsum of thorax where the stripes are hardly discernible. The legs are fulvous.

Hab.—Tasmania: Cradle Mt., 5 ♂, January, 1917.